Work Plan
Screening Site Inspection
Cedar Falls FMGP
Cedar Falls, Iowa
Site #S12; Project #001
Prepared by: E & E/FIT for Region VII EPA
FIT Task Leader: Scott Hayes
Superfund Contact: Pete Culver
Date: February 15, 1991

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HAZARDOUS
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DIVISION

Field Investigation Team Zone II

CONTRACT NO.
68-01-7347

ecology and environment, inc.

International Specialists in the Environment

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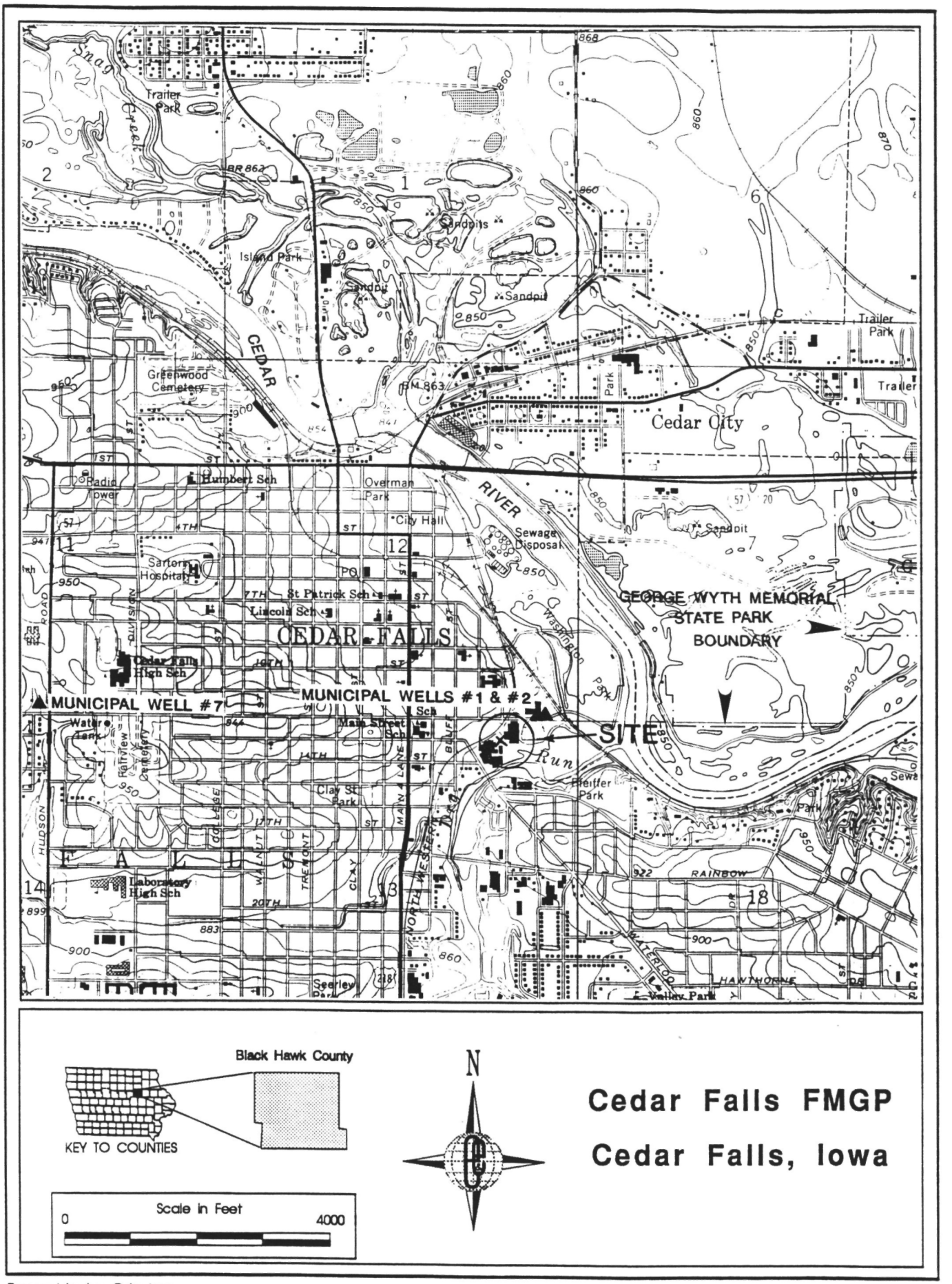
SECTION 1: INTRODUCTION

The Ecology and Environment, Inc., Field Investigation Team (E & E/FIT) was tasked by the Region VII U.S. Environmental Protection Agency (EPA) to prepare a work plan for the Screening Site Inspection (SSI) of Cedar Falls former manufactured gas plant (FMGP) site, CERCLIS ID #IA0984571117 (Figure 1-1). This work was authorized under Technical Directive Document (TDD) #F-07-9011-003. The objectives of this investigation are to determine the presence and extent of potential subsurface wastes and delineate potential contaminant migration through soil, ground water, and surface water pathways. A site reconnaissance was conducted on August 22, 1990, in association with the Preliminary Assessment (E & E/FIT 1990a).

Subsurface soil sampling will be conducted under a subcontract, with contractor oversight of all drilling activities. Solid stem augers will be used to determine the approximate extent of subsurface contamination. With this information, the contractor will determine, in the field, locations for hollow-stem auger continuous sampling. The continuous samples will help to locate contaminant zones and estimate the quantity of subsurface waste. Surface soil samples will be collected in the vicinity of the former locations of the purifier boxes to determine if purifier wastes have contaminated surface soils. The two municipal wells in the site vicinity will be sampled to determine if contaminants have migrated via ground water to the municipal water supply.

The contractor will also install temporary mini-wells and collect shallow ground water samples from on site to determine if contaminants have migrated into ground water.



Prepared by Lee Robertson
Ecology & Environment/FIT August 1990

Waste Site Tracking #IA0278
Source: USGS 7.5' Cedar Falls, IA Quad.1980

Figure 1-1: SITE LOCATION

SECTION 2: SITE DESCRIPTION

The site is located just west of the Cedar Falls Utility Company (CFUC) electric plant at 612 East 12th Street. The site is a former manufactured gas plant (FMGP) owned by the CFUC. In 1959, CFUC was established as an independent political subdivision of the city of Cedar Falls (Rusley 1990). Site contacts may be reached at the following addresses and phone numbers:

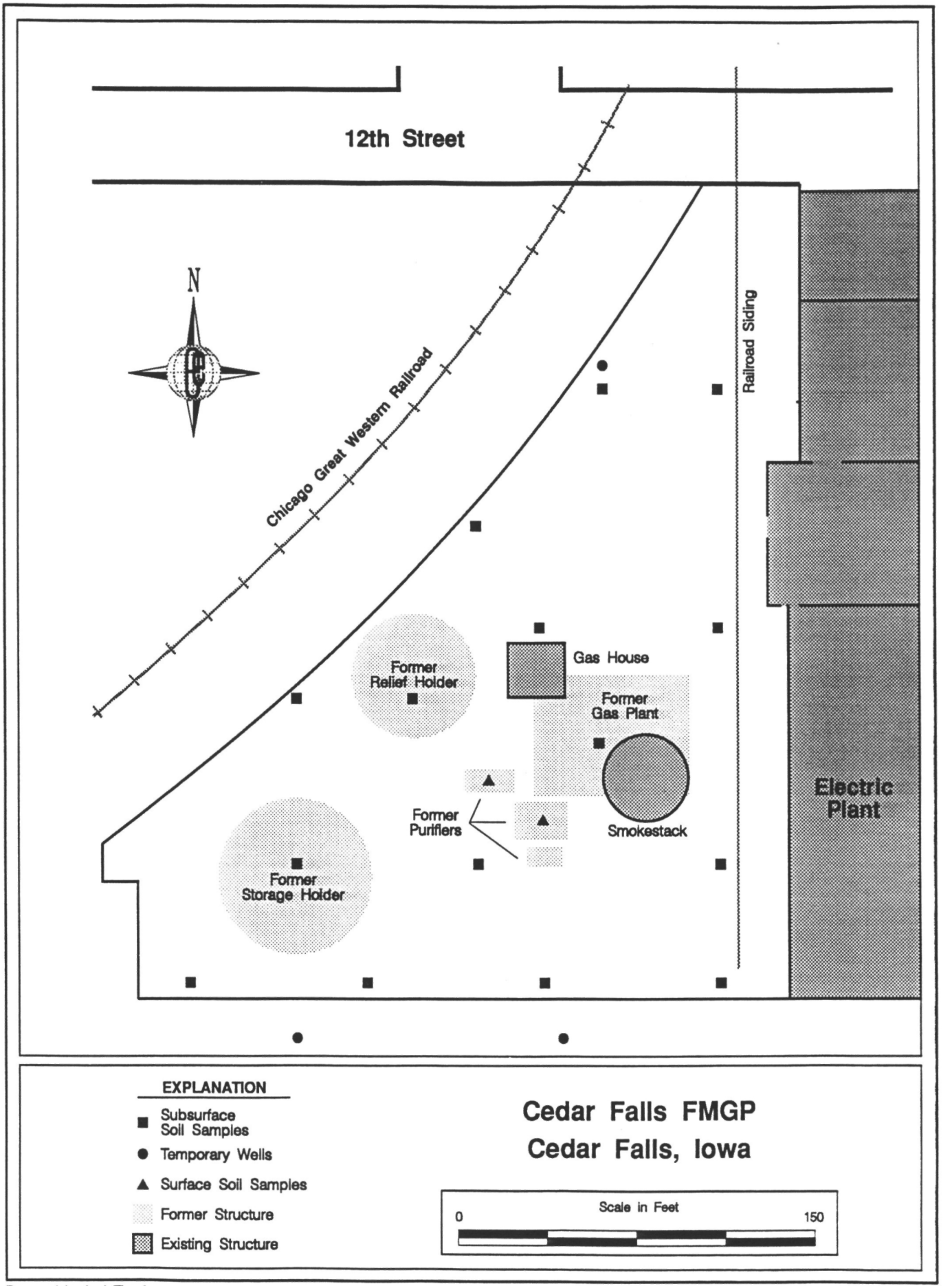
David Rusley, PE
Electric Production Manager
Cedar Falls Utilities
612 East 12th Street
Cedar Falls, IA 50613
(319) 266-1761

Dean Crowe
Business Manager
Cedar Falls Utilities
612 East 12th Street
Cedar Falls, IA 50613
(319) 266-1761

The Cedar Falls FMGP site has always been owned and operated by CFUC. The electrical plant, which is situated east of the site, was in operation before the gas plant was constructed. The electric plant has been expanded over its history to achieve its present size.

The gas plant was constructed in 1934, operated until 1954, and finally dismantled in 1962. The only structures currently on the site are a smokestack and a small gas regulator building (E & E/FIT 1990a) (Figure 2-1).

The site is approximately 330 feet wide at its south end, decreasing to about 30 feet at its north end and measures about 250 feet north to south (Stanely Engineering Company 1948). On the west, the site is bounded by Chicago Great Western Railroad (CGW), which runs southwest to northeast along the site. The north side of the site is bounded by 12th Street; the east edge is bounded by a rail spur and the existing electric plant. The smokestack and gas house building are located



Prepared by Lori Zimpfer
Ecology & Environment/FIT January, 1991

Waste Site Tracking #IA0281
Source: Stanley Engineering Co., No. 1100-2, 1947

Figure 2-1: SITE MAP

approximately where the gas plant was located. The gas holder tanks were located on the western half of the site along the CGW Railroad (Figure 2-1).

A Preliminary Assessment (PA) of the site was conducted in August 1990; no samples were collected. However, previous investigations of similar manufactured gas plants have found coal tars in the subsurface soil. It is possible that tar wastes were spilled or buried in the site vicinity, therefore contaminating the subsurface. Because no sampling has been conducted, the extent of potential contamination is unknown.

The primary targets of concern are the two shallow municipal wells located approximately 600 feet east of the site (Figure 1-1). These wells serve approximately 7,212 people (Cedar Falls Utility Company 1990). The depth to the shallow aquifer is approximately 16 feet, creating a high potential for contamination of the drinking water supply, if wastes are present in the site subsurface.

The targets of secondary concern are two additional municipal wells, approximately 8,500 feet downgradient of the site, and the fisheries of Dry Run Creek and the Cedar River. Dry Run Creek is approximately 500 feet downgradient from the south edge of the site. It then flows approximately 1/4 mile east and discharges into the Cedar River (Figure 1-1). George Wyth Memorial State Park is located along the east bank of the Cedar River, at the point where Dry Run Creek discharges into the river. The Blue-spotted salamander, Ambystoma laterale, a state-endangered species, has been found to inhabit the park (Fleckenstein 1990).

SECTION 3: SUMMARY OF WASTE

Potential contaminants are polynuclear aromatic hydrocarbons (PAHs) associated with coal tars produced as a by-product of manufacturing gas. While in operation, the Cedar Falls FMGP may have produced up to 2,040,000 gallons of tar wastes (USEPA 1985). An exact quantity is not known because of the lack of records. Interviews with former gas plant employees determined that most wastes were shipped off site by railroad. However, there is a potential for wastes to be present.

Any tar wastes buried on site pose a threat to the ground water pathway. The alluvial aquifer is shallow at 16 feet below the ground surface in the area. Two municipal wells are within 600 feet of the site, making the Cedar Falls municipal water supply a potential target. The site is also in a recharge area of the Cedar River; and, therefore, there is a potential for ground water to surface water migration. Contamination could affect the Cedar River fisheries and the George Wyth Memorial State Park.

Another potential waste source is the ferrous cyanides produced from gas purifier wastes. Wood chips used to purify the gas may have been spilled or placed on the ground around the site where the cyanides may have then leached out. These ferrous cyanides are highly persistent and could potentially contaminate the surface water pathway which includes Dry Run Creek, the Cedar River, and their respective fisheries. Interviews with former gas plant employees determined that purifier wastes were disposed off site (Holmes 1990). However, it is possible that these wastes were spilled on site.

SECTION 4: PHYSICAL AND CULTURAL SETTING

4.1 SITE VICINITY AND AIR PATHWAY CONSIDERATIONS

The Cedar Falls FMGP site is on the property of the Cedar Falls Utility Company's electrical power operations, which employs 35 workers. To the north and west, the predominant land use is residential housing. The nearest individual lives approximately 150 feet northwest of the site (E & E/FIT 1990a).

4.2 TOPOGRAPHY AND SURFACE WATER CONSIDERATIONS

The site surface is mostly sand or grass covered and is used for vehicle traffic. The surface is generally flat, except for a slight slope towards Dry Run Creek to the south (E & E/FIT 1990a). The site is approximately 500 feet north of the creek. Dry Run Creek then flows about 1/4 mile to the Cedar River (USGS 1980). The site is not within a floodplain (Murray 1990). The one-year 24-hour rainfall is 3 inches. There is a potential for ground water to surface water migration because of the shallow water table. The depth to water is 16 feet in the site vicinity; and the site is within approximately 500 feet from Dry Run Creek (Malinger 1990).

There are no surface water intakes within 15 miles downstream of the site (CFUC 1990). However, the state-endangered Blue-spotted salamander inhabits George Wyth Memorial State Park, which is in proximity of the site along the east bank of the Cedar River at its confluence with Dry Run Creek (Fleckenstein 1990). The fisheries of Dry Run Creek and the Cedar River are also potential targets.

4.3 HYDROGEOLOGY AND GROUND WATER CONSIDERATIONS

The site lies just above the Cedar River alluvial plain, approximately 1/4 mile west of the river and about 500 feet north of Dry Run Creek (USGS 1980). The site is nearly level. The surface is characterized by grass or exposed sand fill and it is used primarily as a vehicle traffic area (E & E/FIT 1990).

The Quarternary deposits are 35 feet thick in the site vicinity. Well logs of the two municipal wells in the site vicinity indicate dark

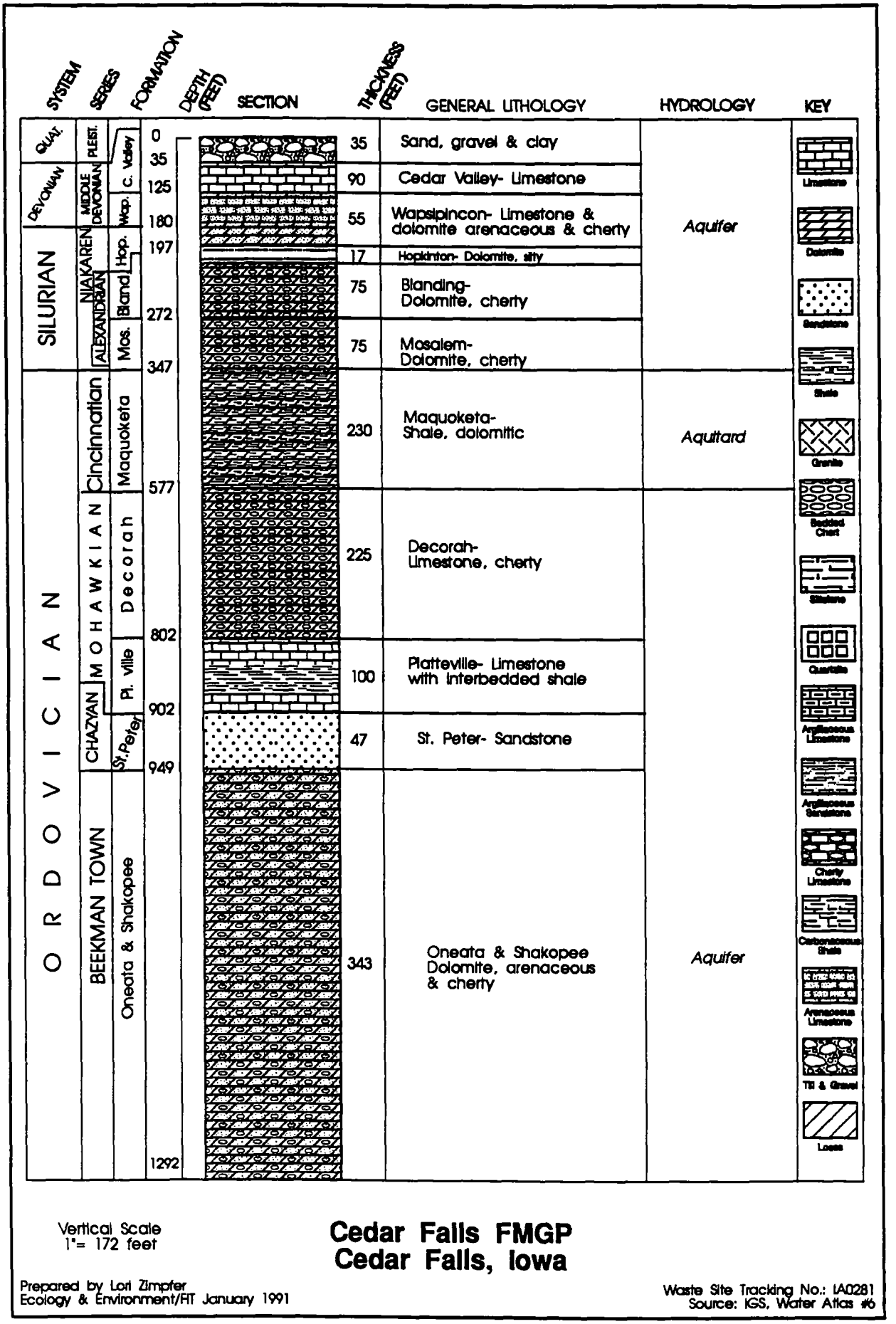
soil from 1 to 4 feet and yellow clay from 4 to 8 feet. Sand and gravel deposits are present from 8 to 35 feet (Cedar Falls 1989). These unconsolidated materials are underlain by the Cedar Valley Limestone (Figure 4-1). This formation is at least 90 feet thick, but averages 120 feet throughout Black Hawk County. The Cedar Valley Limestone is for the most part thinly-bedded, soft, and heavily jointed, serving as a good water reservoir.

The Niakaren Dolomite (Silurian) occurs at about 180 feet deep and is about 170 feet in thickness. This unit tends to be fairly porous near the top and has a moderate water-bearing capacity (IGS 1984).

The Ordovician System underlies the Niakaren and consists of the following formations with typical thicknesses: Maquoketa Shale, 230 feet; Decorah and Platteville limestones, 325 feet; St. Peter Sandstone, 47 feet; and Oneata and Shakopee dolomites, 343 feet. Cambrian-age sandstone begin immediately below the Oneata at a depth of about 1,200 to 1,300 feet. The Maquoketa Formation serves as an aquitard (IGS 1984).

Ground water flow in the site vicinity is generally east to southeast, towards the Cedar River (Bruner 1990). Depth to ground water near the site is approximately 16 feet. Annual net precipitation for the Cedar Falls area is 3 inches. The high permeability and shallow water table create a high potential for migration of contaminants to ground water.

The city of Cedar Falls has nine municipal wells (Malinger 1990), which serve 32,460 people (U.S. Census Bureau 1990). Cedar Falls wells #1 and #2 are within 600 feet of the site; wells #3 and #4 are about 8,500 feet downgradient (southeast) of the site. All Cedar Falls wells range from 125 to 275 feet in depth, drawing from the shallow aquifer. The remaining five wells in Cedar Falls municipal system are within 4 miles of the Cedar Falls FMGP site, but are upgradient of the site. An estimated 14,427 people are served by the four Cedar Falls municipal wells downgradient of the site. The city of Waterloo has two wells approximately 3.25 miles from the site. There are also residences within 4 miles downgradient of the site, which are not served by the Cedar Falls or Waterloo municipal systems.



Vertical Scale
1"= 172 feet

Cedar Falls FMGP
Cedar Falls, Iowa

Prepared by Lori Zimpfer
Ecology & Environment/FIT January 1991

Waste Site Tracking No.: IA0281
Source: IGS, Water Atlas #6

Figure 4-1: GENERALIZED STRATIGRAPHIC COLUMN

SECTION 5: PROPOSED FIELD ACTIVITIES

A total of 12 water samples and 46 soil samples will be collected. Table 5-1 and Figures 1-1 and 2-1 summarize sample matrices, locations, analyses, and containers.

5.1 SOIL SAMPLES

The E & E/FIT proposes to collect 42 subsurface and four surface soil samples to be analyzed for total metals, cyanides, semi-volatiles, and volatile organic compounds (VOCs) at the Cedar Falls FMGP site. Samples submitted for total metals, cyanides, and semi-volatiles analyses will be collected in 8-ounce jars. VOC samples will be collected in two 40-ml vials.

Surface soil samples will be collected from two locations where purifier boxes once were located (Figure 2-1). A duplicate and background will be included. These composite surface soil samples will consist of 5 aliquots taken from a 1-yard-square area at a depth of 0 to 6 inches. The 5 aliquots will be homogenized in a stainless steel pie pan. The VOC samples will be collected as grabs in order to minimize release of volatile organics. The surface soil samples will be used to evaluate and approximate the extent of cyanide contamination associated with purifier wastes.

Drilling and subsurface soil sampling will be performed under a subcontract. Initially, solid stem augers will be advanced to 20 feet at approximately 17 locations. Proposed on-site sample locations are identified on Figure 2-1. Samples will be collected off the auger flights and screened for PAHs and VOCs on site by the E & E/FIT FASP in its mobile laboratory. The samples to be screened will be collected from each 5-foot interval: the PAH sample will be a composite of 5 aliquots, one collected every foot; the VOC sample will be a grab. Four to eight of the sample locations determined by field screening analyses to be most contaminated will be resampled as follows: hollow stem augers equipped with continuous samplers will be advanced to 20 feet offset about two feet

Table 5-1
Proposed Sampling Summary
Cedar Falls FMGP
Cedar Falls, Iowa
E & E/FIT

# of Samples	Matrix	Sample Container/Sample
12	Ground water	2 40-mL VOA vials 1 80 oz. amber jar 3 1-L cubitainer
43	Subsurface soil	2 8-oz glass jars
4	Surface soil	2 40-mL VOA vials

Note: All samples will be submitted to EPA Region VII Laboratory for total metals, cyanide, BNA, and VOC analyses (water additionally for dissolved metals). See Figure 2-1 for approximate sample locations. The number of samples includes duplicates and blanks. Water samples for cyanides analysis will be preserved with NaOH to pH >12. Samples are anticipated to be low concentration environmental samples. Some subsurface soil samples may be considered medium concentration and will be hazard-packed. Water samples to be analyzed for metals will be preserved with nitric acid.

from the screening boring; a composite sample will be collected for each 5-foot interval with one aliquot collected every foot. The VOC sample will be collected from each 5-foot interval first and will be a grab sample. These samples will be submitted to the CLP for cyanides, VOCs, and semi-volatiles analyses. A duplicate and rinsate sample also will be collected from off-site adjacent property south of the site (Figure 2-1).

Additionally, at least one location will be sampled to an approximate depth of 35 feet. The sample will be retrieved using the same method as for the 20-foot boring, with a composite collected from each 5-foot interval. This deep sample is intended to determine the depth to bedrock and help assess the vertical contaminant zone.

To provide sampling quality assurance (QA), two duplicates will be collected, each at a different location from one interval. The subcontractor will be responsible for decontamination of auger equipment be-

tween borings and for backfilling cuttings and borings down the borehole. If cuttings and boring waste must be containerized, the subcontractor will be responsible for the procedure.

All surface and subsurface soil samples will be collected in accordance with the E & E/EPA Region VII Standard Operating Procedure (SOP) for Soil Sampling, E & E Gentech 5.17.

5.2 WATER SAMPLES

A total of up to 12 water samples are proposed by the E & E/FIT for the Cedar Falls FMGP site (Table 5-1). These ground water samples will be used to evaluate the migration of contaminants to the shallow aquifer and the city drinking water supply. All water samples will be analyzed for semi-volatile organics, VOCs, total metals, dissolved metals, and cyanides. Semi-volatile organic samples will be collected in 2-liter amber bottles; VOC samples will be containerized in two 40-ml vials; and cyanide, total metals, and dissolved metals samples will be collected in 1-liter cubitainers and preserved with sodium hydroxide.

Three well samples will be collected from Cedar Falls municipal wells #1 and #2. One sample will be a duplicate. These municipal wells are located approximately 600 feet east of the site on 12th Street (Figure 1-1).

Three well samples will be collected from the three Cedar Falls utilities cooling water wells located within 300 feet east and south of the site.

Four ground water samples will be collected from temporary wells installed with the Geoprobe: one located just upgradient of the site, two located just downgradient of the site (Figure 2-1), and one in a background location. Temporary well samples will be collected by pushing a modified soil-gas rod with 0.02 inch slots below the water table using the Geoprobe hydraulic ram. With the slotted screen in place, 1/4-inch diameter polyethylene tubing will be placed down the well to the screen. The tubing will be attached to a trap and vacuum pump. The pump will be used to purge the well of three well volumes, or at least 1 gallon, and to clean the screen of sediment. The polyethylene tubing will then be retrieved and a small Waterra foot-valve will be attached to the end. The Waterra valve will then be pumped by hand. The Waterra

valve is an inertial system, whereby water flows into the tubing through the open valve when the tubing is pushed down. When the tubing is pulled up, the valve is closed and the water is held in the tubing. By rapidly alternating up and down motions, water will flow up and out of the tubing.

After collecting the sample, the soil-gas rod and well screen will be retrieved, and the hole will be backfilled with bentonite clay. The temporary wells will be installed in accordance with the E & E Standard Operating Procedure for Geoprobe Operation, June 1990 (Draft).

For quality control (QA), an equipment rinsate water sample will be collected by pouring deionized water over decontaminated augers, to check for adequate decontamination of equipment.

The final water sample will be a field blank made from water provided by the Region VII EPA. All water samples will be collected in accordance with E & E/EPA Region VII SOP, for Ground Water Sampling E & E Gentech 5.11.

Regional EPA Region VII Laboratory sample identification, documentation, and tracking requirements under EPA SOP No. DKL030A will be followed. EPA chain-of-custody procedures will meet the standards defined in EPA SOP No. DK020A.

5.3 SITE SAFETY AND DECONTAMINATION PROCEDURES

All field sampling will be initiated in Level-D personal protection. Work areas will be constantly monitored with HNu photo-ionizer or an OVA and HCN-monitox. If safety monitoring and the Regional Safety Officer require upgrading to Level C, protective wear will consist of air purifying respirators with GMC-H cartridges; saranex coveralls with rubber booties; and nitrile gloves with surgical gloves.

Personnel decontamination will consist of removing all expendable outerwear before leaving the site. Contaminated expendable equipment will be double-bagged, taped shut, labeled, and delivered to the EPA Region VII Laboratory for disposal. Any non-disposable equipment will be decontaminated according to the following sequence: solvent wash, soap and water wash, tap water rinse, and final deionized water rinse. Decontamination solutions will be analyzed by the FASP. If the solutions are contaminated, they will be disposed of in "hot zones" on site

or containerized and stored on site pending further disposal. The cuttings from the drilling activities will be discharged down the borehole, with the property owner's approval. If the property owner does not approve, the cuttings will be containerized in drums and kept on site until final disposal can be arranged. If the cuttings are grossly contaminated, they will be containerized for appropriate disposal.

5.4 SCHEDULE AND RESOURCES

This investigation will require a five-member team, with a sixth member conducting a geophysical survey during one day of the week. The team leader will coordinate, document, and assist sampling. The site safety officer will conduct safety monitoring, monitor Geoprobe and drilling operations, and assist in sampling. A chemist will analyze drilling cuttings and assist in sampling. The remaining members will oversee drilling, log boreholes, and assist in sampling.

The LOE required to implement this work plan is as follows:

Equipment:	2 people x 17.5 hours =	35
Travel:	6 people x 14 hours =	84
Field Work:	1 person x 12 hours =	12
	5 people x 62 hours =	310
	Field Screening =	60
Total		501

A trip report detailing field activities will be submitted within three weeks after returning from the field. The final report will be submitted eight weeks after receipt of the analytical data, and will include completed EPA Site Inspection Form 2070-13.

SECTION 6: SUMMARY

The purpose of this SSI is to determine if tar wastes associated with manufactured gas plants are present in the subsurface at the Cedar Falls FMGP site and the approximate extent of any contamination present. Investigations performed during the PA for this site did not determine the presence of any contamination; but the proximity of the site to municipal wells and the fact that the water table is shallow require that sampling be conducted to insure that no contamination is present.

Soil samples will be collected first with water samples to follow. The FIT proposes sampling surface and subsurface soil and ground water to characterize the site. A maximum of 46 soil samples and 12 water samples will be collected. These samples will be analyzed by a CLP laboratory for semi-volatile organics, VOCs, and cyanides. In addition, the FASP will field screen approximately 80 samples for PAHs and VOCs.

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